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10/663,578	09/16/2003	Syamal K. Ghosh	86896RLO	2991

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EXAMINER

WOLLSCHLAGER, JEFFREY MICHAEL

ART UNIT	PAPER NUMBER
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1732

DATE MAILED: 02/28/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/663,578

Applicant(s)

GHOSH ET AL.

Examiner

Jeff Wollschlager

Art Unit

1732

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 December 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) 14-26 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 December 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 3/3/05 and 9/16/03.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____.

DETAILED ACTION

Response to Amendment

Applicant's amendment filed December 14, 2005 has been accepted. Claims 14-26 have been cancelled. The office action dated November 29, 2005 states that claims 1-13 are allowed. Prosecution on the merits of this application is reopened on claims 1-13 now considered unpatentable for the reasons indicated below.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 9 and 11-13 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 9 requires a "third periodic motion". This is indefinite because claim 9 depends from claim 1 and there is no clearly defined second periodic motion in claim 1. Claim 1 is understood to mean that the mixing mechanism provides the first periodic motion inherently. Claim 9 is interpreted to mean that the mixing mechanism will rotate in the mixing container and will reciprocate through the mixing container.

Claim 11 is indefinite because the phrase "moving the mixing mechanism" lacks antecedent basis. Further, it is unclear what is undergoing the second periodic motion in claim 11. Is it the mixing mechanism as stated in claim 11 or the container as stated in claim 8? It is unclear how to examine this claim.

As to claims 12 and 13, the phrase "second periodic direction" lacks antecedent basis. Claims 12 and 13 depend from claim 7, which depends from claim 1. There is no second periodic direction of the container in these claims. It is unclear how to examine these claims.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-4 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Van Slyke et al. (U.S. Patent 6,797,314; issued September 28, 2004; filed July 3,

2001) in view of Shi (U.S. Patent Application Publication 2004/0016907; filed July 21, 2003).

The applied references have a common assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art only under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 103(a) might be overcome by: (1) a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the references was derived from the inventor of this application and is thus not an invention "by another"; (2) a showing of a date of invention for the claimed subject matter of the application which corresponds to subject matter disclosed but not claimed in the references, prior to the effective U.S. filing date of the reference under 37 CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the application and references are currently owned by the same party and that the inventor named in the application is the prior inventor under 35 U.S.C. 104, together with a terminal disclaimer in accordance with 37 CFR 1.321(c). This rejection might also be overcome by showing that the reference is disqualified under 35 U.S.C. 103(c) as prior art in a rejection under 35 U.S.C. 103(a). See MPEP § 706.02(l)(1) and § 706.02(l)(2).

With regard to claim 1, Van Slyke et al. teach a method for forming a homogeneous mixture of powders of organic material including at least one dopant component and one host component to provide a homogeneous mixture for forming a pellet for thermal physical vapor deposition to produce an organic layer on a substrate for use in an organic light-emitting device comprising a) combining organic materials in a powder form, such materials including at least one dopant component and one host component (col. 17 lines 36-43). Van Slyke et al. also teach d) using a mixing

mechanism to form a homogeneous mixture of powder organic materials (col. 4, lines 1-7) and e) combining the homogeneous mixture of organic powder to form a pellet suitable for thermal physical vaporization to produce an organic layer on a substrate for use in an organic light-emitting device (col. 18 lines 6-12).

Further, Van Slyke et al. teach that organic powders used in thermal physical vapor deposition have a high propensity to entrain air and/or moisture between particles under ambient conditions and that it is required to outgas (i.e. remove the entrained moisture and air) a charge of organic powders placed into a vapor deposition chamber through preheating the powder at a reduced pressure (col. 2, lines 45-59). Therefore it would have been obvious to one of ordinary skill in the art at the time of the claimed invention to understand that heating the container having the powder at a reduced pressure would be beneficial since the required outgassing would obviously become more difficult once the powders are compacted into pellet form.

As to the specific pressures claimed in claim 1 these would also be obvious to one of ordinary skill in the art. For example, it is well known that 10^{-1} and 10^{-3} Torr are easily achieved and common pressures in "reduced pressure" environments. Additionally, Van Slyke et al. teach reduced pressures in the 10^{-3} to 10^{-6} range in their disclosure (col. 6, lines 1-3).

With regard to the claimed temperature, it is well known that the boiling point of water is 100 °C at atmospheric pressure and that ambient temperature conditions are about 25 °C. Therefore when Van Slyke et al. teach that the powder must be heated to affect outgassing it would be obvious to one of ordinary skill in the art that the temperature would need to be above 25 °C and that it would not necessarily need to be

above 100 °C. Determining the length of time required to heat the material at the reduced pressure would be dependent upon the amount of powder being outgassed, the heat transfer capabilities of the container, the starting pressure in the container, and the amount of entrained moisture and air to be removed from the powder. So, one of ordinary skill in the art would have to take all of these variables into consideration when determining how long to heat the powder at reduced pressure. As such, time is a recognized control variable for heating and would have been readily optimized. (See *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980)).

Van Slyke et al. do not teach filling the container with an inert atmosphere and mixing the powders in the inert atmosphere.

However Shi teaches a method for forming an analogous homogeneous mixture in which he places the mixture into an inert atmosphere and mixes the material in the inert atmosphere (paragraph [0040]). Therefore it would have been *prima facie* obvious to one of ordinary skill in the art at the time of the claimed invention to modify the method of Van Slyke et al. with the additional inerting step of Shi because providing a chemically non-reactive atmosphere within a heated mixing vessel is well known to prevent decomposition of materials, as demonstrated by Van Slyke et al. in his use of an inerted shroud during his molding step (col. 7, lines 57-66).

As to claim 2, Van Slyke et al. teach mixing or blending the powder organic powder materials (col. 4, lines 1-6). It would be *prima facie* obvious to one of ordinary skill in the art for the mechanism for mixing or blending to include a propeller or a turbine blade.

Claim 3 is directed to the amount of dopant component in the mixture formed by the method of claim 1. The claimed range is 0.1 – 20% by weight. Van Slyke et al. teach that any range of dopant material may be selected (col. 17 lines 41-43). This is read to be from 0 – 100%. Therefore this claim is rendered obvious. "A prior art reference that discloses a range encompassing a somewhat narrower claimed range is sufficient to establish a *prima facie* case of obviousness." In re Peterson, 315 F.3d 1325, 1330, 65 USPQ2d 1379, 1382-83 (Fed. Cir. 2003).

As to claim 4, the inert atmosphere of claim 1 would be well known to one of ordinary skill in the art to be nitrogen gas, argon gas, or a mixture thereof.

Claim 6 includes all the limitations of claim 1, with the additional limitation of storing the container before mixing in a reduced pressure atmosphere. This would have been *prima facie* obvious to one of ordinary skill in the art at the time of the claimed invention for the reasons given above in the rejection of claim 1 and for the reason that it is well known method in the art to provide desired operational conditions as early as possible to increase productivity and decrease the time required to produce the desired product. In this case, it would have been obvious to one of ordinary skill in the art to reduce the pressure in the container before mixing in order to reduce the processing time. Additionally, it would have been obvious to store the powder in the container at reduced pressure to provide additional removal of moisture from the powder.

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Van Slyke et al. (U.S. Patent 6,797,314; issued September 28, 2004; filed July 3, 2001) in view of Shi (U.S. Patent Application Publication 2004/0016907; filed July 21, 2003) and further

in view of Okuyama et al. (U.S. Patent 6,835,681; issued December 28, 2004; filed December 19, 2001).

Regarding claim 5, Van Slyke et al. in view of Shi teach the method of claim 1 as discussed in the 103(a) rejection above, but the combined references do not teach compacting the mixture in a range of pressures between 3,000 – 20,000 pounds per square inch. However, Okuyama et al. analogously teaches compacting a powder mixture in a preferable range of 50 – 200 MPa (approximately 7250 – 29,000 pounds per square inch). Therefore it would have been *prima facie* to take the method of forming a pellet through compaction taught by Van Slyke et al. in view of Shi and complement it with the teaching of Okuyama because one of ordinary skill in the art would be motivated to optimize and better understand pressures useful for forming a pellet. Although the compacting pressure range taught by Okuyama is not identical to the range taught by the instant application, the instant range is still rendered obvious. In the case where the claimed ranges “overlap or lie inside ranges disclosed by the prior art” a *prima facie* case of obviousness exists. In re Wertheim, 541 F.2d 257, 191 USPQ 90 (CCPA 1976); In re Woodruff, 919 F. 2d 1575 16 USPQ2d 1934 (Fed. Cir. 1990).

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Van Slyke et al. (U.S. Patent 6,797,314; issued September 28, 2004; filed July 3, 2001) in view of Shi (U.S. Patent Application Publication 2004/0016907; filed July 21, 2003) and further in view of Staniforth et al. (U.S. Patent Application Publication 2004/0047810; priority date November 30, 2000).

Van Slyke et al. in view of Shi teach the method of claim 1 as discussed in the 103(a) rejection above. The combined references do not teach rotating the mixing

mechanism in a first periodic motion at a rate in a range of 20,000 to 50,000 revolutions per minute. However, Staniforth et al. teach a method of dry mixing powders with a high speed mixer in the range of 5,000 to 20,000 rpm. [paragraph 0069]. Further, high speed mixers with rotational speeds greater than 20,000 rpm are well known in the art and are readily available commercially. Therefore it would have been *prima facie* obvious to take the combined teaching of Van Slyke et al. in view of Shi to mix the powders and modify it with the method taught by Staniforth et al. or to have employed a commercially available powder mixer because one of ordinary skill in the art would have been motivated to find specific mechanisms to implement the mixing taught by Van Slyke et al. in view of Shi. Both the method taught by Staniforth et al. and the commercially available mixers would have been obvious choices. Further, a *prima facie* case of obviousness exists where the claimed ranges and prior art ranges do not overlap but are close enough that one skilled in the art would have expected them to have the same properties. *Titanium Metals Corp. of America v. Banner*, 778 F.2d 775, 227 USPQ 773 (Fed. Cir. 1985).

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Van Slyke et al. (U.S. Patent 6,797,314; issued September 28, 2004; filed July 3, 2001) in view of Shi (U.S. Patent Application Publication 2004/0016907; filed July 21, 2003) and further in view of Beebe (U.S. Patent 6,543,928; issued April 8, 2003).

Van Slyke et al. in view of Shi teach the method of claim 1 as discussed in the 103(a) rejection above. The combined references however do not teach rotating the container in a second periodic motion at a rate in a range of 10 to 60 revolutions per minute.

However, Beebe teaches a method of mixing powders where in addition to using a mixing mechanism to mix the powder, he further rotates the container at a speed of 2 to 30 revolutions per minute (col. 5, lines 7-18). Therefore it would have been *prima facie* obvious to take the method taught by Van Slyke et al. in view of Shi to mix the powders and modify it with the method taught by Beebe because Beebe teaches that mixing powders using a rotating container with an agitator is well known and frequently used to mix dry chemical compounds (col. 1, 38-40) and because one of ordinary skill in the art would be motivated to find specific teachings on mixing methods in light of the combined teaching of Van Slyke et al. in view of Shi. Although the claimed speed differs from the reference, in the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a *prima facie* case of obviousness exists. In re Wertheim, 541 F.2d 257, 191 USPQ 90 (CCPA 1976); In re Woodruff, 919 F. 2d 1575 16 USPQ2d 1934 (Fed. Cir. 1990).

Claims 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Van Slyke et al. (U.S. Patent 6,797,314; issued September 28, 2004; filed July 3, 2001) in view of Shi (U.S. Patent Application Publication 2004/0016907; filed July 21, 2003) and further in view of Renfro (U.S. Patent 6,910,799; filed November 14, 2002).

Van Slyke et al. in view of Shi teach the method of claim 1 as discussed in the 103(a) rejection above. The combined references however do not teach reciprocating the mixing mechanism by means of a pneumatic cylinder and a traversing bracket in a range of 30 to 60 cycles per minute.

However, Renfro teaches a method of mixing particulate materials (col. 1, lines 12-15) where an air cylinder (108) (col. 6, lines 15-18) attached to a cylindrical holding

section (46) (col. 4, line 60) is used to cause a reciprocating motion of the mixing shaft (32) inside the container (see Figure 1). The cylindrical holding section traverses with the cylinder. Therefore it would have been *prima facie* obvious to one of ordinary skill in the art to take the method taught by Van Slyke et al. in view of Shi to mix the powders and modify it with the method of Renfro because it is well known in the art to use a reciprocating motion for mixing and that the reciprocating motion provides additional benefits such as to help degas a mixture. The motivation to do this is provided by Van Slyke et al. who teach that the powders must be mixed and outgassed prior to thermal physical vapor deposition (col. 2, lines 45-59). Determining the periodic frequency that should be utilized for the reciprocating motion would depend on the amount of powder in the container, whether or not the powder needed additional pulverization, and the amount of moisture and/or air entrained in the powder. So, one of ordinary skill in the art would have to take all of these variables into consideration when determining the frequency of the reciprocating motion. As such, frequency of the reciprocating motion is a recognized control variable for mixing and would have been readily optimized. (See *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980)).

Claims 1-4 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Van Slyke et al. (U.S. Patent Application Publication 2003/0008071; published January 9, 2003) in view of Shi (U.S. Patent Application Publication 2004/0016907; filed July 21, 2003).

With regard to claim 1, Van Slyke et al. teach a method for forming a homogeneous mixture of powders of organic material including at least one dopant component and one host component to provide a homogeneous mixture for forming a

pellet for thermal physical vapor deposition to produce an organic layer on a substrate for use in an organic light-emitting device comprising a) combining organic materials in a powder form, such materials including at least one dopant component and one host component (col. 17 lines 36-43). Van Slyke et al. also teach d) using a mixing mechanism to form a homogeneous mixture of powder organic materials (col. 4, lines 1-7) and e) combining the homogeneous mixture of organic powder to form a pellet suitable for thermal physical vaporization to produce an organic layer on a substrate for use in an organic light-emitting device (col. 18 lines 6-12).

Further, Van Slyke et al. teach that organic powders used in thermal physical vapor deposition have a high propensity to entrain air and/or moisture between particles under ambient conditions and that it is required to outgas (i.e. remove the entrained moisture and air) a charge of organic powders placed into a vapor deposition chamber through preheating the powder at a reduced pressure (col. 2, lines 45-59). Therefore it would have been obvious to one of ordinary skill in the art at the time of the claimed invention to understand that heating the container having the powder at a reduced pressure would be beneficial since the required outgassing would obviously become more difficult once the powders are compacted into pellet form.

As to the specific pressures claimed in claim 1 these would also be obvious to one of ordinary skill in the art. For example, it is well known that 10^{-1} and 10^{-3} Torr are easily achieved and common pressures in "reduced pressure" environments. Additionally, Van Slyke et al. teach reduced pressures in the 10^{-3} to 10^{-6} range in their disclosure (col. 6, lines 1-3).

With regard to the claimed temperature, it is well known that the boiling point of water is 100 °C at atmospheric pressure and that ambient temperature conditions are about 25 °C. Therefore when Van Slyke et al. teach that the powder must be heated to affect outgassing it would be obvious to one of ordinary skill in the art that the temperature would need to be above 25 °C and that it would not necessarily need to be above 100 °C. Determining the length of time required to heat the material at the reduced pressure would be dependent upon the amount of powder being outgassed, the heat transfer capabilities of the container, the starting pressure in the container, and the amount of entrained moisture and air to be removed from the powder. So, one of ordinary skill in the art would have to take all of these variables into consideration when determining how long to heat the powder at reduced pressure. As such, time is a recognized control variable for heating and would have been readily optimized. (See *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980)).

Van Slyke et al. do not teach filling the container with an inert atmosphere and mixing the powders in the inert atmosphere.

However Shi teaches a method for forming an analogous homogeneous mixture in which he places the mixture into an inert atmosphere and mixes the material in the inert atmosphere (paragraph [0040]). Therefore it would have been *prima facie* obvious to one of ordinary skill in the art at the time of the claimed invention to modify the method of Van Slyke et al. with the additional inerting step of Shi because providing a chemically non-reactive atmosphere within a heated mixing vessel is well known to prevent decomposition of materials, as demonstrated by Van Slyke et al. in his use of an inerted shroud during his molding step (col. 7, lines 57-66).

As to claim 2, Van Slyke et al. teach mixing or blending the powder organic powder materials (col. 4, lines 1-6). It would be *prima facie* obvious to one of ordinary skill in the art for the mechanism for mixing or blending to include a propeller or a turbine blade.

Claim 3 is directed to the amount of dopant component in the mixture formed by the method of claim 1. The claimed range is 0.1 – 20% by weight. Van Slyke et al. teach that any range of dopant material may be selected (col. 17 lines 41-43). This is read to be from 0 – 100%. Therefore this claim is rendered obvious. "A prior art reference that discloses a range encompassing a somewhat narrower claimed range is sufficient to establish a *prima facie* case of obviousness." In re Peterson, 315 F.3d 1325, 1330, 65 USPQ2d 1379, 1382-83 (Fed. Cir. 2003).

As to claim 4, the inert atmosphere of claim 1 would be well known to one of ordinary skill in the art to be nitrogen gas, argon gas, or a mixture thereof.

Claim 6 includes all the limitations of claim 1, with the additional limitation of storing the container before mixing in a reduced pressure atmosphere. This would have been *prima facie* obvious to one of ordinary skill in the art at the time of the claimed invention for the reasons given above in the rejection of claim 1 and for the reason that it is well known method in the art to provide desired operational conditions as early as possible to increase productivity and decrease the time required to produce the desired product. In this case, it would have been obvious to one of ordinary skill in the art to reduce the pressure in the container before mixing in order to reduce the processing time. Additionally, it would have been obvious to store the powder in the container at reduced pressure to provide additional removal of moisture from the powder.

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Van Slyke et al. (U.S. Patent Application Publication 2003/0008071; published January 9, 2003) in view of Shi (U.S. Patent Application Publication 2004/0016907; filed July 21, 2003) and further in view of Okuyama et al. (U.S. Patent 6,835,681; issued December 28, 2004; filed December 19, 2001).

Regarding claim 5, Van Slyke et al. in view of Shi teach the method of claim 1 as discussed in the 103(a) rejection above, but the combined references do not teach compacting the mixture in a range of pressures between 3,000 – 20,000 pounds per square inch. However, Okuyama et al. analogously teaches compacting a powder mixture in a preferable range of 50 – 200 MPa (approximately 7250 – 29,000 pounds per square inch). Therefore it would have been *prima facie* to take the method of forming a pellet through compaction taught by Van Slyke et al. in view of Shi and complement it with the teaching of Okuyama because one of ordinary skill in the art would be motivated to optimize and better understand pressures useful for forming a pellet. Although the compacting pressure range taught by Okuyama is not identical to the range taught by the instant application, the instant range is still rendered obvious. In the case where the claimed ranges “overlap or lie inside ranges disclosed by the prior art” a *prima facie* case of obviousness exists. In re Wertheim, 541 F.2d 257, 191 USPQ 90 (CCPA 1976); In re Woodruff, 919 F. 2d 1575 16 USPQ2d 1934 (Fed. Cir. 1990).

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Van Slyke et al. (U.S. Patent Application Publication 2003/0008071; published January 9, 2003) in view of Shi (U.S. Patent Application Publication 2004/0016907; filed July 21, 2003) and

further in view of Staniforth et al. (U.S. Patent Application Publication 2004/0047810; priority date November 30, 2000).

Van Slyke et al. in view of Shi teach the method of claim 1 as discussed in the 103(a) rejection above. The combined references do not teach rotating the mixing mechanism in a first periodic motion at a rate in a range of 20,000 to 50,000 revolutions per minute. However, Staniforth et al. teach a method of dry mixing powders with a high speed mixer in the range of 5,000 to 20,000 rpm. [paragraph 0069]. Further, high speed mixers with rotational speeds greater than 20,000 rpm are well known in the art and are readily available commercially. Therefore it would have been *prima facie* obvious to take the combined teaching of Van Slyke et al. in view of Shi to mix the powders and modify it with the method taught by Staniforth et al. or to have employed a commercially available powder mixer because one of ordinary skill in the art would have been motivated to find specific mechanisms to implement the mixing taught by Van Slyke et al. in view of Shi. Both the method taught by Staniforth et al. and the commercially available mixers would have been obvious choices. Further, a *prima facie* case of obviousness exists where the claimed ranges and prior art ranges do not overlap but are close enough that one skilled in the art would have expected them to have the same properties. Titanium Metals Corp. of America v. Banner, 778 F.2d 775, 227 USPQ 773 (Fed. Cir. 1985).

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Van Slyke et al. (U.S. Patent Application Publication 2003/0008071; published January 9, 2003) in view of Shi (U.S. Patent Application Publication 2004/0016907; filed July 21, 2003) and further in view of Beebe (U.S. Patent 6,543,928; issued April 8, 2003).

Van Slyke et al. in view of Shi teach the method of claim 1 as discussed in the 103(a) rejection above. The combined references however do not teach rotating the container in a second periodic motion at a rate in a range of 10 to 60 revolutions per minute.

However, Beebe teaches a method of mixing powders where in addition to using a mixing mechanism to mix the powder, he further rotates the container at a speed of 2 to 30 revolutions per minute (col. 5, lines 7-18). Therefore it would have been *prima facie* obvious to take the method taught by Van Slyke et al. in view of Shi to mix the powders and modify it with the method taught by Beebe because Beebe teaches that mixing powders using a rotating container with an agitator is well known and frequently used to mix dry chemical compounds (col. 1, 38-40) and because one of ordinary skill in the art would be motivated to find specific teachings on mixing methods in light of the combined teaching of Van Slyke et al. in view of Shi. Although the claimed speed differs from the reference, in the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a *prima facie* case of obviousness exists. In re Wertheim, 541 F.2d 257, 191 USPQ 90 (CCPA 1976); In re Woodruff, 919 F. 2d 1575 16 USPQ2d 1934 (Fed. Cir. 1990).

Claims 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Van Slyke et al. (U.S. Patent Application Publication 2003/0008071; published January 9, 2003) in view of Shi (U.S. Patent Application Publication 2004/0016907; filed July 21, 2003) and further in view of Renfro (U.S. Patent 6,910,799; filed November 14, 2002).

Van Slyke et al. in view of Shi teach the method of claim 1 as discussed in the 103(a) rejection above. The combined references however do not teach reciprocating the mixing mechanism by means of a pneumatic cylinder and a traversing bracket in a range of 30 to 60 cycles per minute.

However, Renfro teaches a method of mixing particulate materials (col. 1, lines 12-15) where an air cylinder (108) (col. 6, lines 15-18) attached to a cylindrical holding section (46) (col. 4, line 60) is used to cause a reciprocating motion of the mixing shaft (32) inside the container (see Figure 1). The cylindrical holding section traverses with the cylinder. Therefore it would have been *prima facie* obvious to one of ordinary skill in the art to take the method taught by Van Slyke et al. in view of Shi to mix the powders and modify it with the method of Renfro because it is well known in the art to use a reciprocating motion for mixing and that the reciprocating motion provides additional benefits such as to help degas a mixture. The motivation to do this is provided by Van Slyke et al. who teach that the powders must be mixed and outgassed prior to thermal physical vapor deposition (col. 2, lines 45-59). Determining the periodic frequency that should be utilized for the reciprocating motion would depend on the amount of powder in the container, whether or not the powder needed additional pulverization, and the amount of moisture and/or air entrained in the powder. So, one of ordinary skill in the art would have to take all of these variables into consideration when determining the frequency of the reciprocating motion. As such, frequency of the reciprocating motion is a recognized control variable for mixing and would have been readily optimized. (See *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980)).

Conclusion

All claims are rejected.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeff Wollschlager whose telephone number is 571-272-8937. The examiner can normally be reached on Monday - Friday 7:00 - 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Colaianni can be reached on 571-272-1196. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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JW

Jeff Wollschlager
Examiner
Art Unit 1732

February 22, 2006



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